

A2T Q4T2 Review Key

1) $2 \sin \theta + \sqrt{3} = 0$

$2 \sin \theta = -\sqrt{3}$

$\sin \theta = -\frac{\sqrt{3}}{2} \leftarrow \text{negative}$

$RA = 60^\circ$

Q III

$180 + 60$

$\boxed{240}$

Q IV

$360 - 60$

$\boxed{300}$

(D)

2) $\sqrt{3} \tan x + 1 = 0$

$\sqrt{3} \tan x = -1$

$\tan x = \frac{-1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$

$\tan x = -\frac{\sqrt{3}}{3}$ negative so

$RA = 30$

Q II

$180 - 30$

$\boxed{150}$

A

Q III

$360 - 30$

$\boxed{330}$

3) $7 \cos \theta - 5 = 0$

$7 \cos \theta = 5$

$\cos \theta = \frac{5}{7}$

$\cos^{-1}\left(\frac{5}{7}\right) = 44.4^\circ$ (C)

4) $\log a + \frac{1}{2} \log b$

$\log a + \log b^{\frac{1}{2}}$

$\log a + \log \sqrt{b}$

$\log a\sqrt{b}$

(D)

5) $\frac{x}{y} = \frac{4}{9} = \frac{x}{144}$

$9x = 576$

$x = 64$

(A)

6) $3 \sin x - 1 = 1$

$3 \sin x = 2$

$\sin x = \frac{2}{3}$

$\sin^{-1}\left(\frac{2}{3}\right) = 41.8^\circ$

$\boxed{42^\circ}$

7) $\frac{k^2 - 25}{6k + 30} = \frac{(k-5)(k+5)}{6(k+5)} = \frac{k-5}{6}$

Factor

$$8) 2\tan x + 2 = 0$$

$$2\tan x = -2$$

$$\tan x = -1 \text{ negative so}$$

$$\tan^{-1}(-1) = -45$$

$$RA = 45^\circ$$

→ QII

$$180 - 45$$

$$\boxed{135}$$

QIV

$$360 - 45$$

$$\boxed{315}$$

$$9) 3\tan^2 \theta - 1 = 0$$

$$3\tan^2 \theta = 1$$

$$\tan^2 \theta = \frac{1}{3}$$

$$\tan \theta = \pm \sqrt{\frac{1}{3}} = \pm \frac{\sqrt{1}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \pm \frac{\sqrt{3}}{3}$$

$$\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = 30$$

$$RA = 30$$

QI

$$\boxed{30}$$

QII

$$180 - 30$$

$$\boxed{150}$$

QIII

$$180 + 30$$

$$210$$

QIV

$$360 - 30$$

$$330$$

(C)

$$10) \frac{\cot \theta}{\csc \theta} = \frac{\frac{\cos \theta}{\sin \theta}}{\frac{1}{\sin \theta}} = \frac{\cos \theta}{1} \text{ (B)}$$

$$11) \sin 22 \cos 18 + \cos 22 \sin 18 = \sin(22 + 18) = \boxed{\sin 40} \text{ (A)}$$

$$12) \cos 105 = \cos(45 + 60) = \cos 45 \cdot \cos 60 - \sin 45 \sin 60$$

$$\left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right) - \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$$

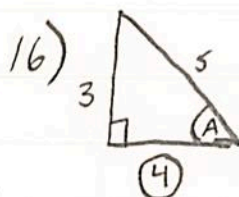
$$\frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} = \boxed{\frac{\sqrt{2} - \sqrt{6}}{4}}$$

From Reference Sheet

13) $1 - 2\sin^2 30 = \cos 2(30) = \cos 60$ (B)

14) $\frac{2\tan 15}{1 - \tan^2 15} = \tan 2(15) = \tan 30 = \boxed{\frac{\sqrt{3}}{3}}$

15) $\cos 2A = 1 - 2\sin^2 A$
 $= 1 - 2\left(\frac{\sqrt{11}}{7}\right)^2$
 $= 1 - 2\left(\frac{11}{49}\right)$
 $= 1 - \frac{22}{49}$
 $= \boxed{\frac{27}{49}}$



Positive Acute Angle is in QI

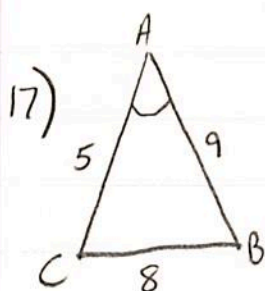
$$\sin \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{2}}$$

$$\sin \frac{A}{2} = + \sqrt{\frac{1 - \cos A}{2}}$$

$$= \sqrt{\frac{1 - \frac{4}{5}}{2}}$$

$$= \sqrt{\frac{\frac{1}{5}}{2}}$$

$$= \sqrt{\frac{1}{10}} = \frac{\sqrt{1}}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \boxed{\frac{\sqrt{10}}{10}}$$



$$8^2 = 9^2 + 5^2 - 2(9)(5)\cos A$$

$$\frac{8^2 - 9^2 - 5^2}{-2(9)(5)} = \cos A$$

$$\frac{7}{15} = \cos A$$
 (A)

18) $|4 - 2y| = 10$

$$4 - 2y = 10$$

$$4 - 2y = -10$$

$$-2y = 6$$

$$-2y = -14$$

$$y = -3$$

$$y = 7$$

$$\boxed{y = -3, 7}$$

19) Use calculator

$$\boxed{50}$$
 (C)

20) $x^2 + 6x + 11 = 0$

$$b^2 - 4ac$$

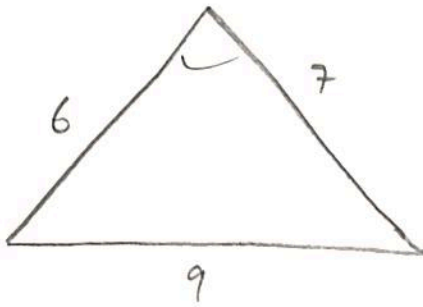
$$6^2 - 4(1)(11)$$

$$36 - 44$$

-8 ← imaginary

$$\text{(B)}$$

21.



$$9^2 = 6^2 + 7^2 - 2(6)(7)\cos x$$

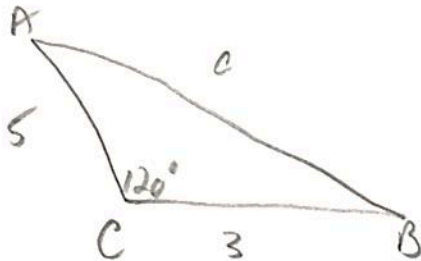
$$\begin{array}{r} 81 = 85 - 84\cos x \\ -85 \quad -85 \hline \end{array}$$

$$\frac{-4}{-84} = \frac{-84\cos x}{-84}$$

$$+\frac{1}{21} = \cos x$$

choice (B)

22.



$$c^2 = 5^2 + 3^2 - 2(5)(3)\cos 120^\circ$$

$$c^2 = 25 + 9 - 30\cos 120^\circ$$

$$c^2 = 34 - 30\cos 120^\circ$$

$$c = 7$$

23.

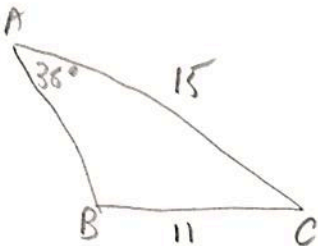
$$\frac{\frac{3}{5}}{4} = \frac{\sin B}{6}$$

$$4\sin B = \frac{3}{5} \cdot 6$$

$$\frac{4\sin B}{4} = \frac{18}{5} \cdot \frac{1}{4}$$

$$\sin B = \frac{9}{10} \cdot \frac{1}{2} \rightarrow \frac{9}{10} \quad (C)$$

24.



$$\frac{\sin 38}{11} = \frac{\sin B}{15}$$

$$\angle B \approx 57$$

$$\text{obuse } \angle \approx 123$$

$$\angle C \approx 19^\circ$$

25)

$$\frac{\sin 48}{9} = \frac{\sin C}{11}$$

$$\angle C \approx 65^\circ \text{ or } 115^\circ \quad (C)$$

26)

$$\frac{\sin 30}{5} = \frac{\sin B}{7}$$

$$\angle B = 44^\circ$$

2 Δ 's

$$136 + 30 < 180 \checkmark$$

(B)

27)

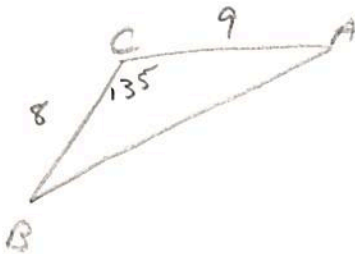
$$\frac{\sin 54}{30} = \frac{\sin B}{35}$$

$$71 + 54 < 180$$

$$109 + 54 < 180$$

2 Δ 's

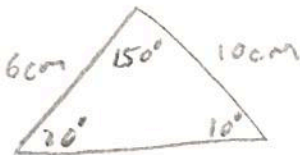
28)



$$A = \frac{1}{2} (8)(9) \sin 135^\circ$$

$$A = 36 \frac{\sqrt{2}}{2} \rightarrow 18\sqrt{2} \quad (A)$$

29)



$$A = \frac{1}{2} (6)(10) \sin 150^\circ$$

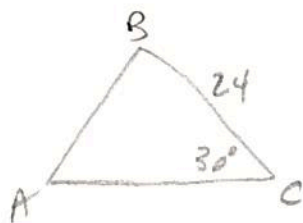
$$= \frac{1}{2} (60) \left(\frac{1}{2} \right)$$

$$= \frac{1}{4} (60)$$

$$= 15 \text{ cm}$$

(C)

30.



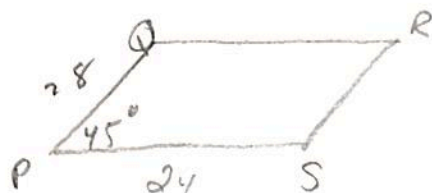
$$A = \frac{1}{2} ab \sin C$$

$$42 = \frac{1}{2} (24)(b) \sin 30$$

$$42 = 12b \left(\frac{1}{2}\right)$$

$$\frac{42}{6} = \frac{6b}{8} \quad b = 7$$

31.

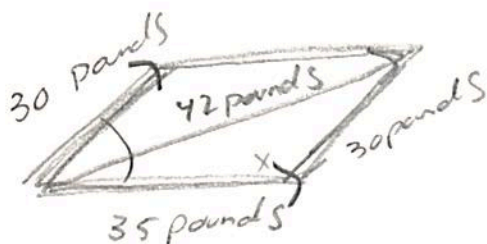


$$A = 28(24) \sin 45$$

$$A = 672 \frac{\sqrt{2}}{2}$$

$$= 336\sqrt{2} \text{ in}^2$$

32.



$$42^2 = 35^2 + 30^2 - 2(35)(30)\cos x$$

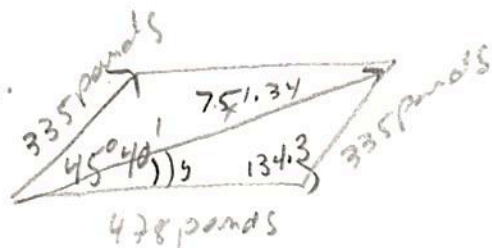
$$1764 = 2125 - 2100\cos x$$

$$\frac{-361}{-2100} = \frac{-2100\cos x}{-2100}$$

$$x \approx 80^\circ$$

x between the two forces is approx $99.9^\circ \approx 100^\circ$

33.



$$x^2 = 478^2 + 335^2 - 2(478)(335)\cos 134.3$$

$$x \approx 751.34$$

$$\frac{\sin y}{335} = \frac{\sin 134.3}{751.34}$$

$$y \approx 18^\circ 40'$$

$$34) \quad g(a) = a+3$$

$$f(a+3) = (a+3)^2 - 2$$

$$a^2 + 6a + 9 - 2 \rightarrow a^2 + 6a + 7$$

$$35) \quad \frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta} \rightarrow \frac{1}{\sin \theta} \rightarrow \csc \theta \quad (D)$$